



Appraisal of Progress and Prospects of Millennium Development Goal -7 In India: A study of Pre and Post Strategy Intervention Period

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Abstract: Since the launch of the Millennium Development Goals at the Millennium Summit in New York September 2000, the MDGs have become the most widely accepted yardstick of development efforts by government. The main objective of present study is appraising the Millennium Developmental Goal 7, halving the percentage of the population without access to basic sanitation between 1990 and 2015. The study is divided into two periods. The statistical tool Historic Rate of Change, Actual Annual Rate of Progress and Required Annual Rate of Progress are used to analysis the progress of MDGs in India. The analysis outline that the HRC of household with access to improved sanitation facilities increased in India with much higher 4.39 percent in the period between 1991 and 2001 in comparison to the 0.82 percent in MDGs period. The study revealed that India only made 4.34 percent of AARP against the RARP of 6.71 percent for achieving the MDG target for this indicator between 1990 and 2015.

Keywords : Millennium Development Goals, India, Improved Sanitation Facilities, Swachh Bharat Abhiyan.

1. INTRODUCTION:

The possible challenges to humanity in the future will be related to the effects of global environmental changes such as climate change, urbanisation, water scarcity and loss of biological diversity. The environment includes all natural and manufactured things, as well as their interrelationships that bring value to humanity today and in the future. The destruction of the environment as a result of human action is a matter of concern¹. The ecosystems and natural resource base must be maintained sustainably to meet people's food requirements as well as other environmental, economic and social needs.² The Millennium Development Goal-7 is primarily concerned with environmental sustainability. Environmental sustainability is an essential component and pillar of long run growth. Now the entire world is concerned about environmental sustainability and countries agree that "we must spare no effort to free all of humanity, especially our children and grandchildren, from the threat of living on a planet irreversibly spoiled by human activities and whose resources would no longer be sufficient for their needs" in the United Nations General Assembly held in 2000.³ Every individual has the right to sufficient, acceptable, accessible, safe and affordable water and sanitation for personal use without discrimination under the human right to water and sanitation. The world is yet a long way from achieving this universal right. An estimated 768 million people lack access to safe drinking water. The right to water has now been widely recognized internationally, including through a 2010 Human Rights Council decision and UN General Assembly resolution the same year.⁴ Safe drinking water and sanitary sanitation are prerequisites for good health and success in the battle against poverty, hunger, child mortality and gender inequality. It is also essential to every man, woman and child on the earth for maintaining their human rights and personal dignity.⁵ In the present situation, the water and sanitation crises are more about access than scarcity. It is primarily caused by poverty and inequality, rather than by a lack of physical resources.⁶ In India majority of population lives in villages. According to the Census 2011, 83.3 crore people (69.84%) still live in villages. It also reveals that 70 percent of India's rural population is still vulnerable to water-borne and vector-borne diseases due to a lack of basic sanitation, unsafe water and unsanitary circumstances. Every year 1.4 million children die due to Diarrhea, which equates to one child every 20 seconds.⁷ Attaining this goal will go a long way toward saving the lives of children. Dr. Margaret Chan, WHO Director-General, stated, "Providing sustainable



access to improved drinking water sources is one of the most essential things we can do to prevent disease".⁸ Millennium Development Goal-7, target 10 focuses on access to safe drinking water and adequate sanitation. Access to water and sanitation are essential for enhancing quality of life and achieving other MDGs, such as lowering poverty and infant mortality, improving maternal health, gender equality and educational opportunities.⁹ The sanitation facilities available to households have a significant impact on living conditions. It is also closely linked to hygiene and health of the members of the household. The NFHS-4 defined "improved sanitation as flush to piped sewer system, flush to septic tank, flush to pit latrine, ventilated improved pit/biogas latrine, pit latrine with slab, twin pit/composting toilet, which is not shared with any other household".

2. RESEARCH METHODOLOGY:

The data collected from secondary sources have been systematically arranged and tabulated in a suitable form for analysis and interpretations. The statistical analysis based on the data was collected from various sources and documented systematically. Throughout the analysis, a comprehensive framework of pre and post programme period applied to assess the progress in achieving each goal. The following are the statistical tools used in the present study.

- i) Estimate Historical Rate of Change
- ii) Computation of Actual Annual Rate of Progress (AARP) and Required Annual Rate of Progress (RARP)

Estimate Historical Rate of Change¹⁰

$X_t = ae^{bt}$ Where X_t is indicator value for year t , which gives for $t=0$,

$$X_0 = a$$

Again,

$$\ln X_t = \ln a + bt$$

Taking natural logarithm of both sides of equation above

$$= \ln X_0 + bt \dots\dots (1)$$

$$\text{i.e. } (b^{\wedge}) = (\ln X_t - \ln X_0)/t \dots\dots (2)$$

In terms of historical rate of change, r

$$X_t = X_0 (1+r)^t$$

$$\text{i.e. } \ln X_t - \ln X_0 = t \ln(1+r)$$

$$\text{or, } (\ln X_t - \ln X_0)/t = \ln(1+r)$$

$$\text{or, } (1+r) = \exp[(\ln X_t - \ln X_0)/t]$$

$$\text{or, } r = \exp[(\ln X_t - \ln X_0)/t] - 1 \dots\dots (3)$$

Using relation (2) in (3) we get

$$r = \exp(b^{\wedge}) - 1 \text{ where } r \text{ is historical rate of change}$$

State-wise and national estimates of the indicators at observation time points have been subjected to the relationship (1) to arrive at their logarithmic values. These values being linear in time series provide the logarithmic values of the measure corresponding to future points of time, from which the estimates at the given point of future time may be derived by anti-log calculation.

Calculate required rate of change¹¹:

The Actual Annual Rate of Progress (AARP)

Some of the selected indicators are positively linked to development while others are negatively related. The indicators which are negatively related to development, the desirable value is close to 0, while it is 100 for others. The



indicators for which the desirable value is close to 0 are poverty, hunger and under five year mortality while for school education, gender equality in education, sanitation and drinking water, it is 100.

The methodology to be used for computing the AARP for those variables where the desirable value is 0 is:

$$\frac{(X_{t_1} - X_{t_0} / X_{t_0})}{t_1 - t_0}$$

Where,

t_0 is the year 1990 (or year closest to 1990 for which data are available)

t_1 is the most recent year for which data are available, and

X_{t_0} and X_{t_1} are the values of the indicator for base year and end year respectively.

For the net primary enrolment ratio gender equality in education and the proportion of population with access to safe water and sanitation, for which the most desirable value is 100%, progress is expressed as Shortfall reduction according to the following formula.

$$\text{Actual Annual Rate of Progress} = \frac{(x_{t_1} - x_{t_0}) / (100 - x_{t_0})}{t_1 - t_0}$$

Required Annual Rate of Progress (RARP)

The required annual rate of progress is the rate which is necessary to reach the MDG. It is calculated as:

$$\frac{\alpha}{t_{\text{mdg}} - t_0}$$

Where α is -1/2 for poverty and hunger, 1/2 for safe water and sanitation, -2/3 for under five mortality and 1 for primary enrolment and gender equality in education.

t_{mdg} is the year by which the target is to be met, and t_0 is the year closest to 1990 for which data are available.

3. RESULTS AND DISCUSSION:

The Millennium Development Goal-7 target 10 halving the percentage of the population without access to basic sanitation between 1990 and 2015. It is estimated that global use of upgraded sanitation facilities increased from 54 percent to 68 percent in the period between 1990 and 2015. Therefore, the global MDGs target of 77 percent has been missed by 9 percent. It reveals that nearly 700 million people are still without access to basic sanitation. The MDGs left a lot of unfinished business despite good progress on sanitation.¹² According to Census 1991, 23.7 percent of India's households had improved sanitation facilities, whereas 76.3 percent of the population lacked a latrine and relied on open defecation.¹³ To meet the MDG-7 in this regard, India will need to provide latrines to 62 percent of households by the end of 2015 in order to reduce the proportion of people without access to basic sanitation by half. Census 2011 estimated that 53 percent of homes in India lack sanitation services and the National Sample Survey 2012 revealed that 43.4 percent of households in India lack latrine facilities. In reference with the present study the table 1 shows the progress of India and its states to access the improved sanitation facilities from 1991 to 2011.

Table: 1 Percentage of Household with Access to Improved Sanitation Facility from 1991 to 2011

S. No.	State	1991	2011	HRC ¹
1	Andhra Pradesh	18.4	32.99	6.01
2	Bihar	11.75	19.19	5.03
3	Gujarat	30.69	44.6	3.81
4	Haryana	62.45	44.5	-3.33
5	Karnataka	24.13	35.16	3.84
6	Kerala	51.28	84.01	5.06
7	Madhya Pradesh	15.07	23.99	4.76
8	Maharashtra	29.56	35.09	1.73



9	Odisha	9.81	14.89	4.26
10	Punjab	33.18	56.84	5.53
11	Rajasthan	19.57	29	4.01
12	Tamil Nadu	23.13	35.16	4.28
13	Uttar Pradesh	18.02	31.43	5.72
14	West Bengal	31.51	43.71	3.33
	India	23.7	36.41	4.39

Source: Census of India 1991 series 1 Part VII, tables on Houses and household Assets & Amenities, Census of India 2001 household amenities and Assets

The table 1 point out that India's performance was remarkable for improved sanitation facilities from 23.7 percent in 1991 to 36.4 percent in 2001 with a Historic Rate of Change of 4.39 percent in the period between 1991 and 2001. It indicates that the Government of India was well aware of the importance of sanitation facilities and fully committed to provide better facilities to its population before the Millennium Declaration. Andhra Pradesh with highest HRC with 6.01 percent and followed by Uttar Pradesh (5.72%), Punjab (5.53%), Kerala (5.06%) and Bihar (5.03%) has performed exceptionally well and improved more than 5 percent of HRC to access the better sanitation facilities in the period 1991 to 2001. While Haryana has showed worst performance with negative HRC in the same period. The table 2 shows the progress of India and states to access improved sanitation facilities from 2005 to 2015.

Table: 2 Percentage of Household with Access to Improved Sanitation Facility from 2005 to 2015

S. No.	State	2005-06	2008-09		2012		2015			HRC ²
		Total	Rural	Urban	Rural	Urban	Rural	Urban	Total	
1	Andhra Pradesh	42.4	34.2	86.8	44.5	91	43.1	77.4	53.6	2.37
2	Arunachal Pradesh	80.4	40.1	74	46.5	97.9	57.1	73.3	61.3	-2.68
3	Assam	76.4	71.7	97	75.4	97.1	45.1	62.2	47.7	-4.60
4	Bihar	25.2	16.8	65.2	25.8	78.4	20.7	54.9	25.2	0.00
5	Chhattisgarh	18.7	15.5	65.5	20	74.9	22.6		32.7	5.75
6	Delhi	92.4	92.6	96	100	98.7	87.7	73.9	74	-2.20
7	Goa	76.0	63.3	89	85.8	96	80.8	76.8	78.3	0.30
8	Gujarat	54.6	32.2	91	40.7	93.6	47	85.3	64.3	1.65
9	Haryana	52.4	53.7	86.8	74.2	98.2	77.4	81.7	79.2	4.22
10	Himachal Pradesh	46.4	51.9	90.2	73.7	95.7	69.6	79.1	70.7	4.30
11	Jammu & Kashmir	61.7	40.6	79.1	44.1	79.4	45.9	66.2	52.5	-1.60
12	Jharkhand	22.6	14.3	73.7	8.9	80.1	12.4	59	24.4	0.77
13	Karnataka	46.5	23.7	86.4	28.4	87.7	42.6	77.3	57.8	2.20
14	Kerala	96.1	93.4	97.2	96.9	98.8	97.5	98.7	98.1	0.21
15	Madhya Pradesh	27.0	13.2	72.6	20.7	84.9	19.4	66.6	33.7	2.24
16	Maharashtra	52.9	37.9	91.3	44.3	92.7	44.2	59.8	51.9	-0.19
17	Manipur	95.6	74.5	82.7	79.6	91.2	51.3	47.8	49.9	-6.29
18	Meghalaya	71.3	81.8	94.4	86	99.4	58.1	67.9	60.3	-1.66
19	Mizoram	98.0	96.4	99	93.4	99.9	73.1	90.9	83.5	-1.59
20	Nagaland	85.6	86.4	87.6	98.1	99.4	79	68.2	75.2	-1.29
21	Odisha	19.3	9.2	63.5	17.3	80.5	23	61	29.4	4.30
22	Punjab	70.8	61.9	91.9	77.6	93.3	79.1	85	81.5	1.42
23	Rajasthan	30.8	17.1	85.1	26.1	78.3	35.6	72.5	45	3.86
24	Sikkim	89.0	97	100	99.1	100	94.2	76	88.2	-0.09



25	Tamil Nadu	42.9	25.2	79.9	33	86.6	34	69.7	52.2	1.98
26	Tripura	96.7	82.1	94.3	88.6	98.1	59.6	65.1	61.3	-4.46
27	Uttar Pradesh	33.1	44.9	95.5	22.4	86.7	23.2	68.4	35	0.56
28	Uttarakhand	56.8	18.5	79.3	80.2	97.6	59.6	73.3	64.5	1.28
29	West Bengal	59.6	51.7	89.9	58	93.2	45.5	62	50.9	-1.57
	India	44.6	31.9	85.3	38.8	89.6	36.7	70.3	48.4	0.82

Source: National Family Health Surveys -3(2005-06) & 4 (2015-16), National Sample Survey 2008-09 & 2012

The table 2 points out that household with improved sanitation facilities increased from 44.6 percent in 2005 to 48.4 percent in 2015 with HRC of 0.82 percent between these periods. Among the states Kerala (98.1%), Sikkim (88.2%) and Mizoram (83.5%) recorded the highest percentage of households with improved sanitation facilities. While the lowest percentage of households with improved sanitation has 24.4 percent in Jharkhand followed by Bihar (25.2%), Odisha (29.4%), Chhattisgarh (32.7%), Madhya Pradesh (33.7%), Uttar Pradesh (35%) and Rajasthan (45%) in 2015. It signifies that the past's "BIMARU" states continue to drag India backward in terms of social indicators. The abbreviation "BIMARU" was established in the 1980s to describe the economic state of Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh.¹⁴

The data in table 2 also shows that there is a significant difference in performance between the best and worst performing states, which is one of the reasons India is falling behind in meeting the objective by the end of 2015. In pre MDGs period the Indian government launched its flagship Total Sanitation Campaign (TSC) in 1999, it set a goal of universal household sanitation coverage by 2012. The programme is in place in 606 districts across 30 states and union territories.¹⁵ To speed up sanitation progress in rural regions, the Indian government developed a paradigm change in the Total Sanitation Campaign (TSC), which was renamed Nirmal Bharat Abhiyan (NBA) at the commencement of the 12th Five-Year Plan. The goal of NBA is to achieve long-term behaviour change by the provision of sanitary facilities in all communities in a phased, saturation mode and 'Nirmal Grams' as the final outcome. The intention is to use a community saturation approach to transform rural India into "Nirmal Bharat". The NBA goal is to ensure that all rural households have access to sanitation by 2022. Swachh Bharat Abhiyan is currently being developed with the goal of achieving a 100% Open Defecation Free (ODF) India by 2019.¹⁶

Despite the fact that the Indian government has implemented many sanitation programmes and laws, as well as set up thousands of public toilets around the country. The table 2 also shows that there remains a significant urban-rural disparity in terms of sanitation facilities in India. According to NFHS-4, open defecation occurs in two out of every three rural Indian homes, while it occurs in 29.7 percent of urban Indian households. In terms of open defecation, the table 2 also shows a clear picture of a large rural-urban disparity among Indian states. Rural areas in practically every state lag far behind in terms of basic sanitation in their homes. In rural Madhya Pradesh 80.6 percent of families practising open defecation and 33.4 percent in urban areas occupy the top position in the list of the rural-urban disparity. Jharkhand is next with a 46.6 percent gap, followed by Uttar Pradesh (45.2 %), Gujarat (38.3%), Odisha (38.3%), Rajasthan (36.9%), Tamil Nadu (35.7%), Andhra Pradesh (34.3%) and Bihar (34.2%). The rural-urban disparity in these states was higher than the national average of 33.6 percent.

Table:3 Appraisal of Progress on Access to Improved Sanitation Facility in Pre and Post Strategy Intervention Period

S. No.	State	HRC ¹	HRC ²
1	Andhra Pradesh	6.01	2.37
2	Bihar	5.03	0.00
3	Gujarat	3.81	1.65
4	Haryana	-3.33	4.22
5	Karnataka	3.84	2.20
6	Kerala	5.06	0.21
7	Madhya Pradesh	4.76	2.24
8	Maharashtra	1.73	-0.19
9	Odisha	4.26	4.30
10	Punjab	5.53	1.42
11	Rajasthan	4.01	3.86
12	Tamil Nadu	4.28	1.98



13	Uttar Pradesh	5.72	0.56
14	West Bengal	3.33	-1.57
	India	4.39	0.82

Source: Computed from the table 1 and 2

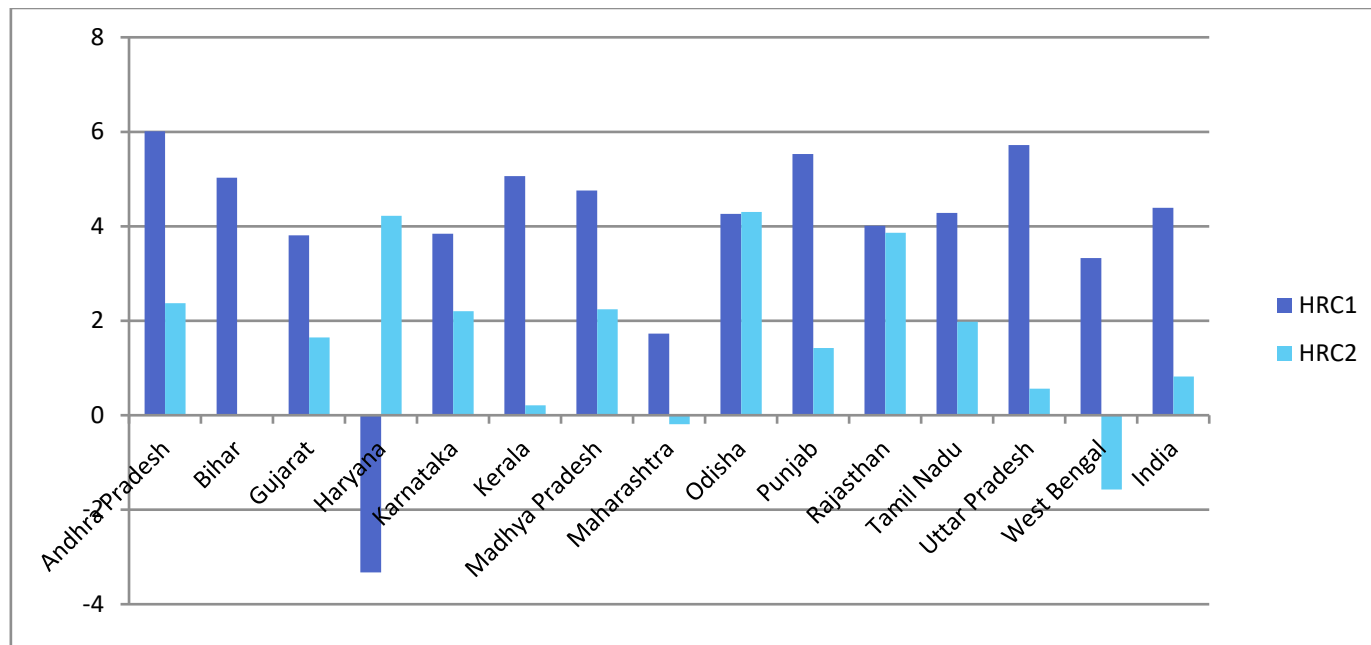


Figure: 1 The Progress of India and States on household with access improved sanitation facility in Pre and Post Strategy Intervention Period

The figure1 depicts that household with access to improved sanitation facilities increased more than five times the Historical Rate of Change in Pre MDGs period in comparison to the strategy intervention period in India. India's performance from 1991 to 2001 suggests that Indian governments were well aware of the necessity of sanitation for socio-economic development prior to the millennium declaration. The Central Rural Sanitation Programme (CRSP) was established by India in 1986 with the primary goal of enhancing the quality of life of rural people and also providing privacy and dignity to women. CRSP for the larger idea of sanitation adopted a "demand-driven" strategy with the name "Total Sanitation Campaign (TSC)" for the border concept of sanitation with effect from 1999. The redesigned approach placed a greater emphasis on Human Resource Development, Information Education and Communication (IEC), and Capacity Development activities to raise awareness among rural people and generate demand for sanitary services. India had also set a goal of universal household sanitation coverage by 2012.¹⁷ There is considerable inter-state diversity in Historical Rates of Change in two different periods. All the states except Haryana and Odisha showed better performance in the first period in comparison to the second period.

Table:4 Evaluation of Progress of State toward the Millennium Developmental Goal-7

S. No.	State	1991	Actual 2015	Target 2015	AARP	RARP	Progress Remark
1	Andhra Pradesh	18.4	53.6	59	7.97	9.24	Insufficient
2	Bihar	11.8	25.2	56	4.77	15.65	Insufficient
3	Gujarat	30.7	64.3	65	4.56	4.70	On Track
4	Haryana	62.5	79.2	81	1.12	1.25	On Track
5	Karnataka	24.1	57.8	62	5.81	6.55	On Track
6	Kerala	51.3	98.1	76	3.80	1.98	Achieved
7	Madhya Pradesh	15.1	33.7	58	5.15	11.74	Insufficient
8	Maharashtra	29.6	51.9	65	3.15	4.96	Insufficient
9	Odisha	9.8	29.4	55	8.32	19.15	Insufficient
10	Punjab	33.2	81.5	67	7.97	4.20	Achieved



11	Rajasthan	19.	45	60	5.41	8.56	Insufficient
12	Tamil Nadu	23.13	52.2	62	5.24	6.92	Insufficient
13	Uttar Pradesh	18.0	35	59	3.93	9.48	Insufficient
14	West Bengal	31.5	50.9	66	2.56	4.53	Insufficient
	India	23.7	48.4	62	4.34	6.71	Insufficient

Source: Table 4 computed from the table 1 and 2

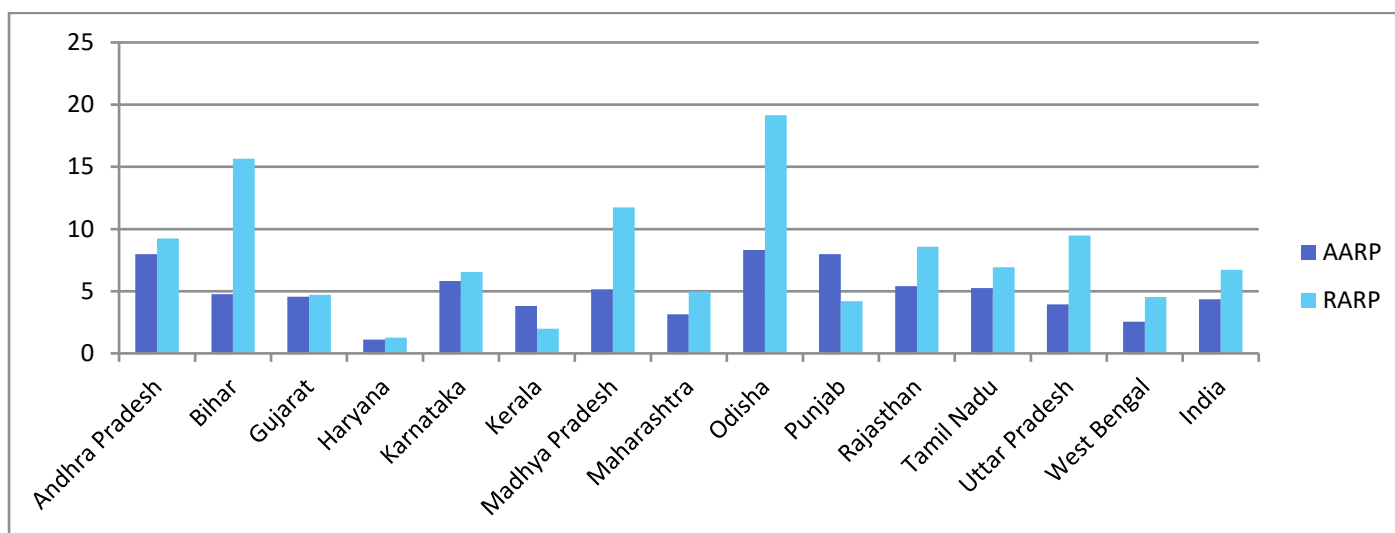


Figure: 2 The Actual Annual Rate of Progress and Required Annual Rate of Progress of India and States on household with access to improved sanitation facility

The figure 2 demonstrates the performance of states on the basis of Required Annual Rate of Progress (RARP) in comparison to their Actual Annual Rate of Progress (AARP). The table 4 shows that India only made 4.34 percent of AARP against the RARP of 6.71 percent for achieving the MDG target for this indicator between 1990 and 2015. It confirms that India is lagging far behind the MDG target for this indicator between 1990 and 2015. In the major states of India only Kerala and Punjab have achieved their respective targets. Kerala progresses with AARP 3.80 percent in comparison to the RARP of 1.98 percent and Punjab also shows higher AARP 7.97 percent in comparison to RARP of 4.20 percent. The past performance of Kerala and Punjab in the period 1990 to 2001 with more than 5 percent of Historical Rate of Change is one of the foremost reasons to achieve the respective target value. Gujarat, Haryana and Karnataka are states that are just narrowly lagging behind their respective targets. While the socio-economically well-off states like Maharashtra and Tamil Nadu failed in meeting the target by the end of 2015 due to the existing insufficient rate of progress. The study's primary argument is that there are significant differences in the past performance as well as future prospects of different states in terms of Millennium Developmental indicators.

5. CONCLUSION:

It is inferred from above analysis and discussion on Millennium Development Goal-7 that India has registered better performance to access the improved sanitation facility in pre MDGs period with HRC of 4.39 percent in comparison to increases more than five times of Historical Rate of Change in Pre MDGs period in comparison to 0.82 percent in MDGs period. In spite of this, India only managed 4.37 percent of AARP against the RARP of 6.71 percent for achieving the MDG target for this indicator between 1990 and 2015. The study's primary argument is that there are significant differences in the past performance as well as future prospects of different states in terms of Millennium Developmental indicators. The study concluded that India cannot hope to meet the goals unless significant progress is made particularly in the bigger states like Uttar Pradesh, Bihar, Madhya Pradesh, Odisha and Rajasthan in Millennium Developmental indicators. These states not only currently account for over half of the county's population, but they will also account for an even bigger share of the county's youngest population in near future. The performance of India will be determined by how these states improve the socio-economic indicators related to health, education, job opportunities and cleanliness in future.

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